Where does the money come from? Financing challenges for a Meshed Offshore Grid

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2. Main barriers to investing in a MOG
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Today electricity is one of the most valuable commodities in the world, is a matter of life.

For having electricity the grid is needed.

If no new grid between 2020-2040→+ 43 bln €/year (ENTSO-E, 2018)

Therefore, the EU and the national states need to enable investments in grid infrastructure.
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2. Main barriers & concerns to investing in a MOG

- TSOs, industry and financing sector are willing to invest but
- the current legal and regulatory frameworks do not support investments in a MOG.

Main TSOs’ concerns:
  - Permitting issues
  - Public acceptance
  - Complexity due to different national regulatory frameworks
  - Timely adjusted return on equity (RoE)
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2. Main barriers & concerns to investing in a MOG

- Private investors’ concerns:
  - TSO-monopoly
  - State-owned TSOs do not allow private equity injection
  - Regulatory clarity/retroactive actions/regulatory consistency
  - Complexity due to different national regulatory frameworks
  - Lack of central EU planning and structure
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3. Financial challenges

- Huge investment volume:
  - Only up to 2030 EUR 100 billion for offshore electricity grids within the North Sea Region is estimated by ENTSO-E. (ENTSO-E, 2014)

- Significant equity is needed but

- State-owned TSOs face government’s budget constraints

- State-owned TSOs reluctant to dilute their ownership share → they do not allow private shareholders

- TSO balance sheet constraints: increasing debt financing → high gearing → lower credit rating

- If interest rates increase may the private investors seek for other more profitable investments in the market → limited financing potential for the TSOs
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4. Possible investment models

- North Sea Grid (NSG) TSO
- Possible structures for legal ownership of NSG TSO:
  - Not-for-profit
  - National TSOs
  - National TSOs & private investors
- Grid planning & co-ordination:
  - National TSOs and national authorities
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**North Sea Grid (NSG) TSO**

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Advantages:
- One entity responsible for construction and operation of the MOG
  - less interfaces
  - achieve faster a common approach to the development of a MOG
- If NSG TSO is an enterprise with a reasonable RoE
  - private investors interested being shareholders
- If NSG TSO is a not-for-profit enterprise
  - cost for the society might be lower

Disadvantages:
- If NSG TSO is an enterprise with a RoE
  - might be more costly for the society
- If NSG TSO is a not-for-profit
  - no business opportunity for private investors
Disadvantages:

- Will this model, where private investors are also shareholders in the NSG TSO, be applicable to countries where by law the sole shareholder of electricity grid (onshore and offshore) is the government?
- Great effort for the development of a uniform legal and regulatory framework and tariff structure is needed.
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### 2. National TSOs

- **Investment**: Each TSO or operator (OFTO in UK) responsible for the offshore grid within their EEZ
- **Grid planning & co-ordination**: national TSOs and national authorities

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Advantages:
- Existing regulatory basis and structures already in place.

Disadvantages:
- Great effort for co-ordination and convergence of different regulations is needed.
- Additional regulations for cross-border connections of OWFs
- More time might be needed to achieve a common approach for the development of a MOG → possible financial loss for society and negative impact on the security of supply from the delay
- Equity provision constraints
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3rd party investor

- Separate operation from ownership
- Investment: tendering of transmission assets to 3rd parties who:
  - own,
  - build and
  - maintain the offshore grid assets
- Operation: NSG ISO (Independent System Operator) who:
  - operates the MOG,
  - defines the technical requirements and specifications for maintenance, repair, replacement and reconstruction.
- Grid planning & co-ordination: national TSOs or ISO and national authorities
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3rd party investor

- Possible structure for legal ownership of NSG ISO:
  - not-for-profit enterprise or
  - co-operation of national TSOs of the countries surrounding the North Sea

- 3rd party:
  - a concessionaire, SPV of private investors and/or TSOs
  - obliged to keep the technical requirements and specifications set by NSG ISO but
  - retain flexibility for technical design
  - Paid e.g. for availability of the asset
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3rd party investor

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Advantages:
- Equity provision is facilitated.
- Higher competition for construction and technical design of offshore assets → capital costs savings
- Create cost benchmarks → benefit for consumers
- Increase innovation → benefit for consumers
- At the same time more transmission assets can be built → faster processes to reach a common realisation of the MOG → benefit for consumers

Disadvantages:
- Higher effort for communication and co-ordination with several entities might be needed.
- Not applicable to countries where by law the national TSO is appointed the owner (and operator) of the offshore grid.
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CATO (Competitively Appointed Transmission Owner)

- **Investment**: CATO’s appointed, through tenders, by the states surrounding the North Sea to be responsible for
  - the ownership
  - construction,
  - operation of offshore grid assets
  - maintenance of offshore grid assets

- **System operation**: NSG ISO responsible for dispatching, etc.

- **Legal ownership**: CATO could be private investors also in consortia with TSOs

- **Grid planning & co-ordination**: national TSOs and national authorities
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CATO (Competitively Appointed Transmission Owner)

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CATO

Advantages:
- Equity provision is facilitated.
- Higher competition for construction and technical design of offshore assets → capital costs savings
- Create cost benchmarks → benefit for consumers
- Increase innovation → benefit for consumers

Disadvantages:
- Greater effort to co-ordinate planning and operation among the different CATOs
- Greater effort to align incentives and goals among the different CATOs
- More time to reach a common approach for the development of a MOG → negative impact on the security of supply and financial loss for the society
- Possibly greater efforts for dispatch of the entire transmission system
- Not applicable to countries where by law the electricity grid is state-owned.
5. Summary

Financial challenges for a MOG in the North Sea mainly due to:

- huge investment volume
- cannot be covered only by debt side due to TSO balance sheet constraints
- significant equity financing is needed but equity provision is often hindered due to
  - government budget constraints
  - legal restrictions on access to private equity
- if interest rates increase → offshore grid investments in greater competition with more favourable investments in the market → limited financing potential for the sector
5. Summary

Possible investment models to facilitate a MOG in the North Sea:

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In all investment models:
- a common grid planning and co-ordination is needed,
- significant effort for development of a uniform legal and regulatory framework and tariff system is required.
5. Summary

- NSG TSO, also with private shareholders, 3rd party investor and CATO
  - facilitate private equity provision but
  - under the existing legal frameworks might not be applicable

- 3rd party investor and CATO:
  - capital cost savings by increasing competition but
  - more co-ordination is needed among the different entities
5. Summary

- Studies have shown positive CBA for co-ordinated offshore grid in the North Sea*
- CBCA defines level of compensation payments but lack of sufficient compensation mechanisms for the countries with no direct benefits → hinder MOG development in the North Sea → improvement of compensation mechanisms is needed
- Regional co-operation supported by strong political will is needed.


3E; Deutsche WindGuard; CEPS; DNV GL; ECN; Imperial College Consultants, Final Report of the NorthSeaGrid project, 2015,